

CLAIMS

What is claimed is:

- 5 1. A multi-carrier modulation communications system for providing channel estimation comprising:
 - a transmitter for inserting pilot symbols in a digital multi-carrier modulated radio frequency (RF) signal;
 - a receiver for receiving the pilot symbols in a multi-carrier modulation RF signal, wherein the receiver performs the steps:
 - 10 detecting channel power gains from a plurality of designated pilot symbols;
 - calculating a speed parameter (S) and a multi-path parameter (M) of the channel receiving the pilot symbols;
 - defining a channel model based upon the speed parameter and
 - 15 multi-path parameter value;
 - choosing a predefined set of pilot coefficients that substantially matches the channel model; and
 - utilizing the set of pilot coefficients for optimizing pilot symbol interpolation.
- 20 2. A method for selecting an optimum set of pilot coefficients by estimating channel condition through a channel estimation scheme, comprising the steps of:
 - detecting channel power gains from a plurality of designated pilot
 - 25 symbols;
 - calculating a speed parameter (S) and a multi-path parameter (M) of the channel receiving the pilot symbols;

defining a channel model based upon the speed parameter and multi-path parameter value;

choosing a predefined set of pilot coefficients that substantially match the channel model; and

5 utilizing the set of pilot coefficients for optimizing pilot symbol interpolation.

3. A method for selecting an optimum set of pilot coefficients as in claim 2, wherein the speed parameter is based upon the velocity of the data
10 channel receiving the pilot symbols.

4. A method for selecting an optimum set of pilot coefficients as in claim 2, wherein the multi-path parameter determines changes in frequency of the
15 data channel receiving the pilot symbols.

5. A method for selecting an optimum set of pilot coefficients as in claim 2, wherein the predefined set of pilot coefficients is selected to provide the lowest bit error rate (BER) based upon the speed parameter and multi-path
20 parameter.

6. A method for estimating channel condition through a channel estimation scheme, comprising the steps of:

detecting channel power gains from a plurality of designated pilot symbols;

25 calculating a speed parameter (S) and a multi-path parameter (M) of channel receiving the pilot symbols;

defining a channel model based upon the speed parameter and multi-path parameter value;

choosing a predefined set of pilot coefficients that substantially match the channel model; and

utilizing the set of pilot coefficients for optimizing pilot symbol interpolation.

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7. A method for estimating channel condition as in claim 6, wherein the speed parameter is based upon the velocity of the data channel receiving the pilot symbols.

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8. A method for estimating channel condition as in claim 6, wherein the multi-path parameter determines changes in frequency of the data channel receiving the pilot symbols.

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9. A method for estimating channel condition in claim 6, wherein any active system component provides the lowest bit error rate (BER) based upon the speed parameter and multi-path parameter.